

SureStep® Stepping Systems

High-performance microstepping drives with high-torque stepping motors

SureStep stepping systems provide simple and accurate control of position and speed where open-loop control and cost are considerations. Pulses (or "step" and "direction" signals) from the DirectLOGIC family of PLCs or other indexers and motion controllers are "translated" by the microstepping drive into precise movement of the stepping motor shaft. The SureStep stepping motors use 2-phase technology with 200 full steps per revolution or 1.8° per full step. Older type stepping motor drives, which operate stepping motors in full step mode, can result in stalling or lost motion due to potential problems with low speed mechanical vibration (usually between 100 to 200 RPM). To minimize this vibration problem, the SureStep microstepping drives use advanced microstepping technology to smooth the motor motion and stepping response.

Standards and Agency Approvals



How fast can my system go?

PLC		SureStep Drive Steps/Rev Selection **			
Model	Fastest Output	400 Steps/Rev	1000 Steps/Rev	2000 Steps/Rev	10,000 Steps/Rev
DL05, DL105	7kHz	1,050	420	210	42
DL06	10 kHz	1,500	600	300	60
H0/H2/H4/T1H -CTRI0	25 kHz	3,750	1,500	750	150
H2-CTRI02	250 kHz	37,500	15,000	7,500	1,500
P3-HSO	1MHz	150,000	60,000	30,000	6,000

* These speeds are theoretical maximums. See torque curves of specific motors for their rpm limits.

** Full step (200 steps/rev) will allow higher top speed. Full stepping, however, can create vibration at low speed.

The STP-DRV-4035 has selectable microstep resolutions of 400 (half-step); 1,000 (each full step ÷ 5 microsteps); 2,000 (÷ 10); or 10,000 (÷ 50).

The STP-DRV-6575 has selectable resolutions of 200 (full-step); 400 (half-step); 2,000; 5,000; 12,800; or 20,000 steps per revolution.

The advanced drives (STP-DRV-4805, STP-DRV-80100) have software-selectable resolutions ranging from 200 (full step) to 51,200 (÷ 256) steps per revolution.

The advanced drives can operate with traditional high-speed inputs, but can also be commanded via 0–5V analog input. They have an internal indexer that can accomplish point-to-point moves controlled via ASCII communication.

FREE configuration software!

SureStep Pro configuration software is available that makes setting parameters a snap for the advanced drives (STP-DRV-4850 & STP-DRV-80100)! Download free from our website:

<http://support.automationdirect.com/products/surestep.html>

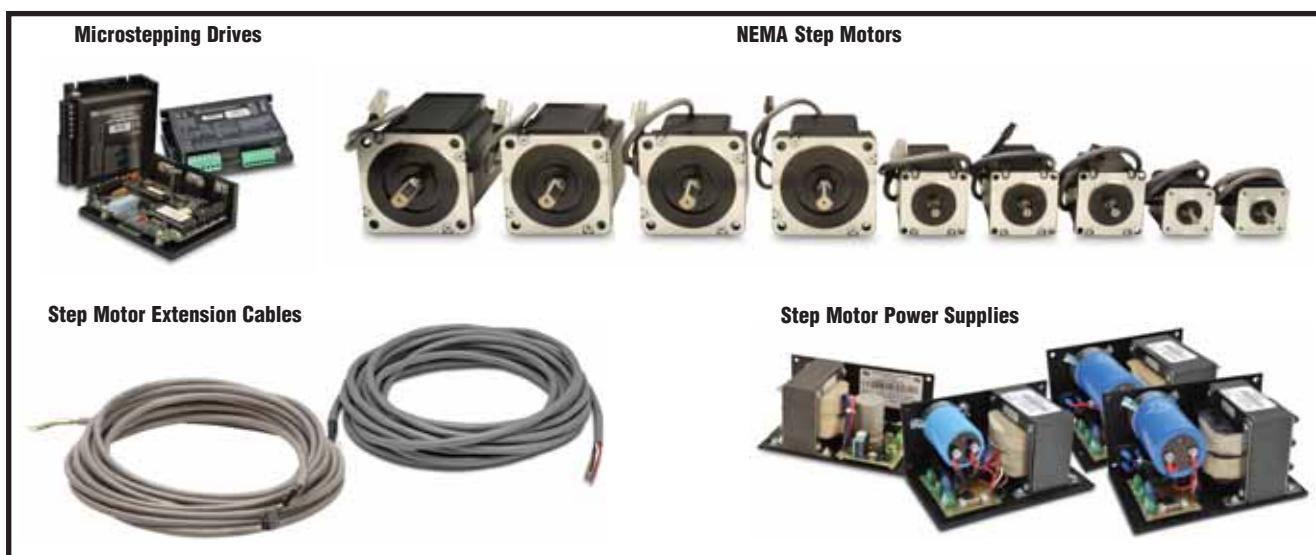
Stepping Motor RPM = (A ÷ B) x (60 seconds/minute)

Where: A = PLC output frequency (pulses per second)
B = microstepping resolution selection (steps/revolution)

Maximum RPM =		Steps/Sec A	÷	Steps/Rev B	X	Sec/Min
Example 1:	1,500 =	10,000	÷	400	X	60
DL06 with 10 kHz Built-in Pulse Output						
Example 2:	3,750 =	25,000	÷	400	X	60
Hx-CTRI0 with 25 kHz Pulse Output						

Four components to make a complete system

Choose a drive, motor, motor extension cable and power supply



SureStep® Stepping Systems

Stepping System : Head to Head

AutomationDirect **VS.** Competition

Hey - I can do the math! - AutomationDirect

A complete 2-axis SureStep™ Stepping System for less than just the competition's stepping drives.

SureStep™ NEMA 23 System Long Stack



\$421
Complete
2 Axis System



Parker

E-DC

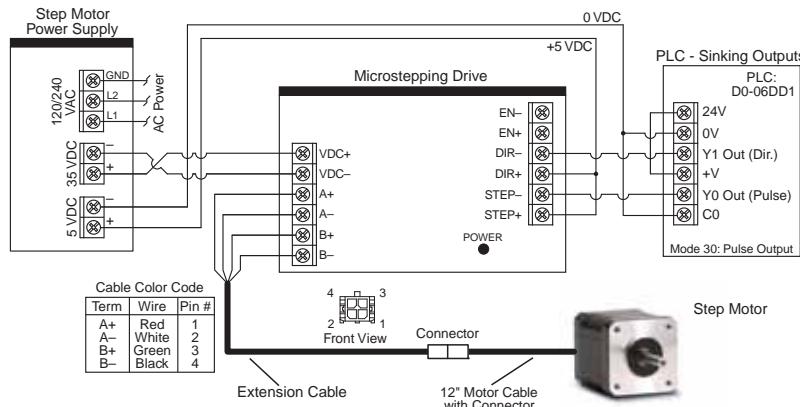
\$608
for 2 drives



Ours includes:

- Two Microstepping Drives (STP-DRV-6575)
- Two Stepper Motors (STP-MTR-23079)
- One Power Supply (STP-PWR-3204)
- Two Extension Cables (STP-EXT-020)

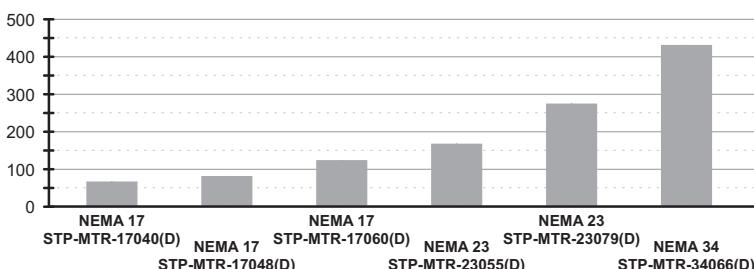
All prices are U.S. published prices. AutomationDirect prices are from December 2012 Price List. Parker prices are from <http://buy.compmotor.com 2/20/12>.



High-torque stepping motors with 1-ft. cable and 4-wire locking connector

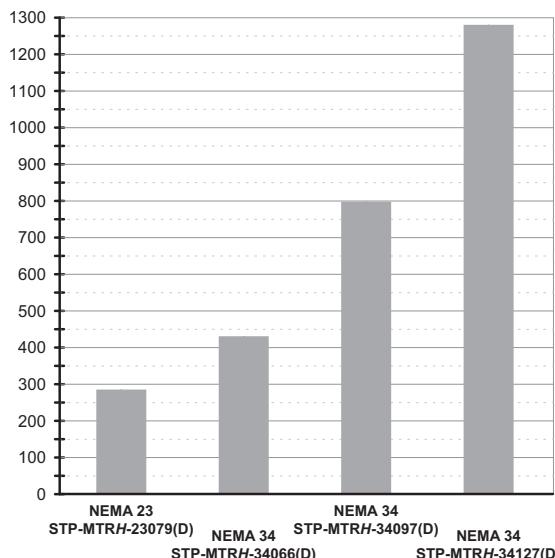
The SureStep stepping family has twenty high-torque motors to handle a wide range of automation applications such as woodworking, assembly, and test machines. The motors are available in both single-shaft and dual-shaft configurations. Our square frame or "high-torque" style stepping motors are the latest technology, resulting in the best torque to volume. We have NEMA 17, 23, and 34 mounting flanges and holding torque ranges from 61 to 1288 oz-in. Optional 20-foot extension cables with locking connectors are available to interface any of the stepping motors to the microstepping drive. The extension cables can be easily cut to length, if desired.

Holding Torque (oz·in)



High Torque Motors (MTR)

Holding Torque (oz·in) Higher Torque Motors (MTRH)



High-performance microstepping drive

SureStep microstepping drives

(STP-DRV-4035 & STP-DRV-6575)

- Two models available
- Standard high-speed pulse input (pulse and direction)
- On-board or removable screw terminals for easy hook-up
- Optically-isolated inputs ready for +5VDC logic from DirectLOGIC PLCs, or 5–24 VDC (depending on model).
- No software or add-on resistors required for drive configuration; dipswitch and/or rotary-dial set-up
- Dipswitch used for built-in self-test, microstep resolution selection, current level selection, and optional idle current reduction.

SureStep advanced microstepping drives

(STP-DRV-4850 & STP-DRV-80100)

All the features of the high-performance drive, plus:

- Software configurable
- 200 - 51,200 microsteps (software selectable)
- High-speed pulse input (Quadrature, cw/ccw, pulse/direction)
- Analog velocity mode (0-5v or potentiometer)
- Internal indexer (point-to-point moves via ASCII command)

Linear power supplies

- 32V @ 4A, 48V @ 5A, 48V @ 10A, 70V @ 5A
- Input and output fuses included on power supplies
- Includes 5 VDC Logic supply for all low voltage signals

SureStep® Choose your SureStep System

1. Choose a motor

Determine the torque and speed required by your application. Then look at the motor speed-torque curves in the "SureStep Stepping System Motors" section of this catalog chapter. Choose a motor that can run your application with plenty of speed and torque reserve (most stepper systems should have a 100% safety margin for torque).

NEMA 17, 23 and 34 mounting flanges



Twenty bipolar step motors to cover a wide range of applications

Holding torque ranges from 61 to 1288 oz-in



Single-shaft and Dual-shaft models available

1-ft cable (4-wire) with locking connector on the end

Square frame style produces high torque and achieves best torque to volume ratio

2. Choose a motor extension cable

Our 20-ft motor extension cables have a locking connector that mates up to the motor cable. The extension cables allow you to quickly connect the motor to the drive without having to splice wires or cut any cables.
If you chose an STP-MTR-xxxx motor, select an STP-EXT-020 cable.
If you chose an STP-MTRH-xxxx motor, select an STP-EXTH-020 cable.
(The "H" motors and cable can handle higher motor current)

20-foot extension cable with locking connector; for use with all SureStep motors

STP-EXT-020
STP-EXTH-020



3. Choose a drive

This chart is a quick selection guide. For a full list of features, check out the Technical Info later in this chapter.

What you need	STP-DRV-4035	STP-DRV-4850	STP-DRV-6575	STP-DRV-80100
32V Speed-Torque Curve (from Step 1)	✓	✓	✓	✓
48V Speed-Torque Curve (from Step 1)	-	✓	✓	✓
70V Speed-Torque Curve (from Step 1)	-	-	-	✓
Pulse & Direction Input	✓	✓	✓	✓
More than 3.5A/motor phase	-	✓	✓	✓
More than 5A/motor phase ("H" motors)	-	-	✓	✓
Internal Indexing (Drive can move from Point A to Point B with a serial communication command)	-	✓	-	✓
Analog Velocity Input	-	✓	-	✓

Optional idle current reduction

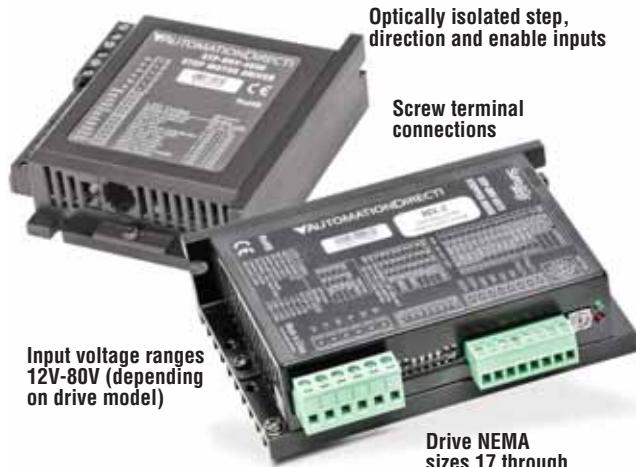
Adjustable microstep resolutions

0.1 to 10 amps (depending on drive model)

Optically isolated step, direction and enable inputs

Screw terminal connections

Input voltage ranges 12V-80V (depending on drive model)



Drive NEMA sizes 17 through 34 step motors

...in 4 easy steps

4. Choose a power supply

Since all SureStep motors can operate at 32V, 48V, and 70V, the selection of a power supply is dependent on the selected speed-torque curve of the motor and on the selection of drive. Choose a power supply that matches the desired speed-torque curve

and stays within the voltage limit of the selected drive. Each power supply has incoming AC and outgoing DC fusing. There is also an electronically overload protected 5V supply for all your logic needs.

Permissible Drive/Power Supply Combinations

Power Supply	STP-PWR-3204	STP-PWR-4805	STP-PWR-4810	STP-PWR-7005
Drive				
STP-DRV-4035	✓	-	-	-
STP-DRV-4850	✓	✓	✓	-
STP-DRV-6575	✓	✓	✓	-
STP-DRV-80100	✓	✓	✓	✓

For systems that use multiple drives and only one power supply, please read our SureStep User Manual (under "Product Documentation") to properly size multiple systems.

120 or 240 VAC, 50/60 Hz power input (switch selectable)

32V, 48V and 70V linear supplies

Power ON LEDs

Unregulated linear supplies perfect for stepper systems

Input and output fusing included

Screw terminal AC input and DC output connections



5 VDC ±5% at 500 mA regulated logic power

2-Phase Microstepping Drive



Motor Extension Cable

(represented by a blue line)

Typical System

Step Motor Power Supply



NEMA Step Motor



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Safety

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Part #

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SureStep® Stepping Systems

SureStep® System Overview



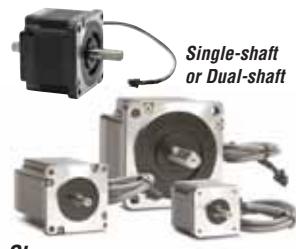
**SureStep
Step Motor Power Supply**



**SureStep
Microstepping Drive**



**SureStep
Extension Cable**



**SureStep
Connectorized Step Motor**

SureStep stepping system includes:

- Four step motor power supplies
- Two DIP-switch configurable microstepping drives
- Two software configurable advanced microstepping drives
- Two motor extension cables
- Twenty step motors (NEMA 17, 23, 34 frame sizes; single & dual shaft)

Standard stepper drive features

(STP-DRV-4035 & STP-DRV-6575)

- Low cost, digital step motor driver in compact package
- Operates from Step & Direction signals, or Step CW & Step CCW (jumper selectable)
- Fault output (-6575 only) & Enable input
- Optically isolated I/O
- Digital filters prevent position error from electrical noise on command signals; jumper selectable: 150 kHz or 2MHz (-6575 only)
- Rotary or DIP switch easily selects from many popular motors
- Electronic damping and anti-resonance (-6575 only)
- Automatic idle current reduction to reduce heat when motor is not moving; switch selectable: 50% or 90% of running current
- Switch selectable step resolution: 200 (full-step); 400 (half-step); 2,000; 5,000; 12,800; or 20,000 steps per revolution (-6575 only)
- Switch selectable microstep emulation provides smoother, more reliable motion in full and half step modes
- Automatic self test (switch selectable)
- Operates from a 24–65 VDC or 12–40 VDC power supply, depending upon model
- Running current from 0.5–7.5A

Advanced stepper drive features

(STP-DRV-4850 & STP-DRV-80100)

- Max 5A, 48V and max 10A, 80V models available
- Software configurable
- Programmable microsteps
- Internal indexer (via ASCII commands)
- Self test feature
- Idle current reduction
- Anti-resonance
- Torque ripple smoothing
- Step, analog, & serial communication inputs
- Serial communications allow point-to-point positioning

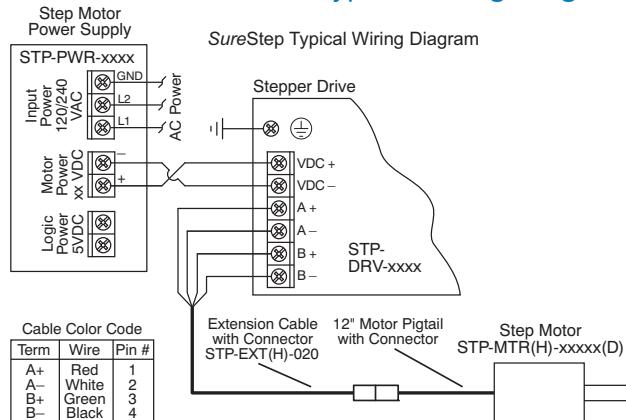
Motor features

- High torque, 2-phase, bipolar, 1.8° per step, 4-lead
- Available in single-shaft and dual-shaft models
- Connectorized
- (6) NEMA 17 motors
- (6) NEMA 23 motors
- (8) NEMA 34 motors

Power supply features

- Linear, unregulated DC power supplies
- 120/240 VAC selectable input
- 32V, 48V, 70V DC output models available
- All models have additional 5VDC, 500 mA regulated logic supply
- Fusing included for both incoming AC and outgoing DC
- 5V supply has electronic overload protection

Typical Wiring Diagram



SureStep Power Supply / Drive Compatibility

Drive(1)(2)	Recommended Power Supply(1)(2)			
	Model #	STP-PWR -3024	STP-PWR -4805	STP-PWR -4810
STP-DRV-4035	✓	No	No	No
STP-DRV-4850	✓	✓	✓	No
STP-DRV-6575	✓	✓	✓	No
STP-DRV-80100	✓	✓	✓	✓

1) Do NOT use a power supply that exceeds the drive's input voltage range.
If using a non-STP linear power supply, ensure that the unloaded voltage does not float above the drive's maximum input range.

2) For best performance, use the lowest voltage power supply that supplies the required speed and torque.

SureStep Drive / Motor Compatibility

Motor(1)(2)	Recommended Drive(1)						
	Model # (1)(2)	Rated Amps	Extension Cable(2)	STP-DRV -4035(1)	STP-DRV -4850(1)	STP-DRV -6575(1)	STP-DRV -80100(1)
STP-MTR-17040(D)	1.7	STP-EXT-020	✓	✓	✓	-	-
STP-MTR-17048(D)	2.0		✓	✓	✓		
STP-MTR-17060(D)	2.0		✓	✓	✓		
STP-MTR-23055(D)	2.8		✓	✓	✓		
STP-MTR-23079(D)	2.8		✓	✓	✓		
STP-MTR-34066(D)	2.8		✓	✓	✓		
STP-MTRH-23079(D)	5.6	STP-EXTH-020	✓	✓	✓	✓	✓
STP-MTRH-34066(D)	6.3		-	✓	✓	✓	✓
STP-MTRH-34097(D)	6.3		✓	✓	✓	✓	✓
STP-MTRH-34127(D)	6.3		✓	✓	✓	✓	✓

1) The combinations above will perform according to the published speed/torque curves. However, any STP motor can be used with any STP drive. Using a motor with a current rating higher than the drive's output rating will proportionally limit the motor torque.

2) MTR motors have connectors compatible with the EXT extension cables. MTRH motors have connectors compatible with the EXTH extension cables.

SureStep® Stepping Systems

SureStep® Microstepping Drives Overview

SureStep Series – Microstepping Drives Features Comparison				
Drive Model	Standard Microstepping Drives		Advanced Microstepping Drives	
	STP-DRV-6575	STP-DRV-4035	STP-DRV-4850	STP-DRV-80100
Price	<--->	<--->	<--->	<--->
Drive Type	Microstepping drive with pulse input		Advanced microstepping drive with pulse or analog input, serial communication; includes programming/communication cable STP-232RJ11-CBL	
	enclosed	open-frame	enclosed	
Output Current	0.5–7.5 A/phase	0.4–3.5 A/phase	0.1–5 A/phase	0.1–10 A/phase
Input Voltage	nominal: 24–65 VDC range: 20–75 VDC	nominal: 12–32 VDC range: 12–42 VDC	nominal: 24–48 VDC range: 18–53 VDC	nominal: 24–80 VDC range: 18–88 VDC
Configuration Method	rotary dial, dip switches, jumpers	dip switches	SureStep Pro software (included)	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	MOSFET, dual H-bridge, bipolar chopper	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	4-state PWM 20 kHz	4-state PWM @ 20 kHz	4-state PWM @ 20 kHz
Microstep Resolution	dipswitch selectable	dipswitch selectable	software selectable	software selectable
	200 to 20,000 steps/rev	400 to 10,000 steps/rev	200 to 51200 steps/rev	
Modes of Operation	Step & Dir	YES	YES	YES
	CW/CCW	YES	n/a	YES
	A/B Quad	n/a	n/a	YES
	Oscillator	n/a	n/a	YES
	Serial Indexing	n/a	n/a	YES
Digital Input Signals	Step/Pulse	step & direction, CW/CCW step	step & direction	step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits
	Direction			
	Enable	motor disable	motor disable	motor enable, alarm reset, speed select (oscillator mode)
Analog Input		n/a	n/a	speed control
Output Signal		fault	n/a	fault, motion, tach
Communication Interface		n/a	n/a	YES (programming/communication cable included)
Non-volatile Memory Storage		n/a	n/a	YES
Idle Current Reduction		YES	YES	YES
Self Test		YES	YES	YES
Additional Features		Load inertia (anti-resonance & damping feature to improve motor performance) Step pulse noise filter	n/a	Anti-resonance (Electronic Damping) Auto setup Microstep emulation Torque ripple smoothing (allows for fine adjustment of phase in the range 0.25 to 1.5 rps) Waveform (command signal) smoothing
Refer to Specifications Tables for detailed specifications				



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/Lights

Process

Relays/Timers

Comm.

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SureStep® Stepping Systems

SureStep® Standard Microstepping Drives



SureStep Series Specifications – Standard Microstepping Drives		
Microstepping Drive	STP-DRV-6575	STP-DRV-4035
Drive Type	Microstepping drive with pulse input	Microstepping drive with pulse input
Output Current	Selectable from 0.5–7.5 A/phase (peak of sine)	Selectable from 0.4 to 3.5 A/phase (maximum output power is 140W)
Input Voltage (external p/s required)	Nominal: 24–65 VDC Range: 20–75 VDC	Nominal: 12–32 VDC Range: 12–42 VDC (including ripple voltage)
Configuration Method	Rotary dial, DIP switches, jumpers	DIP switches
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	MOSFET, dual H-bridge, bipolar chopper
Current Control	4-state PWM @ 20 kHz	4-state PWM @ 20 kHz
Protection	n/a	n/a
Recommended Input Fusing	Fuse: 7A fast-acting; ADC #ACG7; Holder: ADC # DN-F6L110	Fuse: 4A fast-acting; ADC # ACG4; Holder: ADC # DN-F6L110
Input Signals	Input Circuit	5–24 VDC nominal (range: 4–30 VDC); optically isolated, differential.
	Step/Pulse	Minimum pulse width = 0.25 µs. Maximum pulse frequency = 150 kHz or 2MHz (user selectable).
	Direction	FUNCTIONS: step & direction, CW/CCW step
	Enable	FUNCTION: disable motor when closed
	Analog	n/a
Output Signal	30 VDC / 80 mA max, optically isolated photodarlington, sinking or sourcing. Function = closes on drive fault.	n/a
Features	Current Reduction	Reduce power consumption and heat generation by limiting motor running current to 100%, 90%, or 80% of maximum. Current should be increased to 120% if microstepping. (Torque is reduced/increased by the same %.)
	Idle Current Reduction	90% or 50% of running current. (Holding torque is reduced by the same %.)
	Microstep Resolution	20000, 12800, 5000, 2000, 400 smooth, 400, 200 smooth, or 200 steps/rev.
	Phase Current Setting	(1.3–6.3) x 80%–120% DIP switch selectable
	Self Test	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational
	Step Pulse Noise Filter	Select 150 kHz or 2MHz
	Load Inertia	Set motor and load inertia range to 0–4x or 5–10x.
Connectors	Removable screw terminal blocks. Motor & Power Supply: 30–12 AWG; Signals: 30–14 AWG	Screw terminal blocks with AWG 18 maximum wire size
Maximum Humidity	90% non-condensing	90% non-condensing
Storage/Ambient Temperature	0 to 50 °C [32 to 122 °F] (mount to suitable heat sink)	-20 to 80 °C [-4 to 176 °F]
Operating Temperature	0 to 85 °C [32 to 185 °F] (interior of electronics section)	0 to 55 °C [32 to 131 °F] recommended; 70 °C [158 °F] maximum
Drive Cooling Method	Natural convection (mount drive to metal surface)	Natural convection (mount drive to metal surface to dissipate heat)
Mounting	(2) #6 screws to mount wide or narrow side to metal surface	(4) #4 screws to mount on wide side; (2) #4 screws to mount on narrow side
Weight	10.8 oz [306g] – (including mating connectors)	9.3 oz. [264 g]
Agency Approvals	CE (EMC & LVD); RoHS	CE (complies with EN55011A & EN50082-1 (1992)), RoHS

SureStep® Stepping Systems

SureStep® Advanced Microstepping Drives



SureStep Series Specifications – Advanced Microstepping Drives		
Microstepping Drive	STP-DRV-4850	STP-DRV-80100
Drive Type	Advanced microstepping drive with pulse or analog input, serial communication (serial communication allows indexing capability)	
Output Current	0.1-5.0 A/phase (in 0.01A increments)	0.1-10.0 A/phase (in 0.01A increments)
Input Voltage (external p/s required)	24-48 VDC (nominal) (range: 18-53 VDC)	24-80 VDC (nominal) (range: 18-88 VDC)
Configuration Method	SureStep Pro software (included)	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	
Protection	over-voltage, under-voltage, over-temperature, external output faults (phase-to-phase & phase-to-ground), inter-amplifier shorts	
Recommended Input Fusing	Fuse: 4A 3AG delay (ADC #MDL4) Fuse Holder: ADC #DN-F6L110	Fuse: 6.25A 3AG delay (ADC #MDL6-25) Fuse Holder: ADC #DN-F6L110
Input Signals	Input Circuit	Opto-coupler input with 5 to 15 mA input current; Logic Low is input 0.8 VDC or less; Logic High is input 4 VDC or higher.
	Step/Pulse	optically isolated, differential, 5V, 330Ω; min pulse width = 250 ns max pulse frequency = 2MHz
	Direction	adjustable bandwidth digital noise rejection feature FUNCTIONS: step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits
	Enable	Optically isolated, 5-12V, 680Ω; FUNCTIONS: motor enable, alarm reset, speed select (oscillator mode)
	Analog	Range: 0-5 VDC; Resolution: 12 bit; FUNCTION: speed control
Output Signal	Optically isolated, 24V, 10mA max; FUNCTIONS: fault, motion, tach	
Communication Interface	RS-232; RJ11 (6P4C) receptacle	
Non-volatile Memory Storage	Configurations are saved in FLASH memory on-board the DSP.	
Features	Idle Current Reduction	Reduction range of 0-90% of running current after delay selectable in ms
	Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
	Modes of Operation	Step & direction, CW/CCW, A/B quadrature, oscillator, joystick, serial commands
	Phase Current Setting	0.1-5.0 A/phase (in 0.01A increments)
	Self Test	Checks internal & external power supply voltages, diagnoses open motor phases
	Additional Features	Anti-resonance (Electronic Damping) Auto setup Microstep emulation Torque ripple smoothing (allows for fine adjustment of phase in the range 0.25 to 1.5 rps) Waveform (command signal) smoothing
	Connectors	Communication: RJ11 (6P4C); programming/communication cable STP-232RJ11-CBL included Other: removable screw terminal blocks; Motor & Power Supply: 26-12 AWG; Signals: 28-16 AWG
Maximum Humidity	90% non-condensing	
Storage Temperature	-20 to 80 °C [-4 to 176 °F]	
Operating Temperature	0 to 55 °C [32 to 131 °F]; (mount to suitable heat sink)	
Drive Cooling Method	Natural convection (mount to suitable heat sink)	
Mounting	#6 mounting screws (mount to suitable heat sink)	
Weight	8 oz [227g] (approximate)	
Agency Approvals	CE, RoHS	

SureStep® Stepping System Drives

SureStep® Microstepping Drives Accessories

Braking Accessories

If you plan to use a regulated or switching power supply, you might encounter problems from regeneration. As a load rapidly decelerates from a high speed, much of the kinetic energy of that load is transferred back to the motor. This energy is then pushed back to the drive and power supply, resulting in increased system voltage. If there is enough overhauling load on the motor, the DC voltage will go above the drive and/or power supply limits.

This can trip the overvoltage protection of a switching power supply or a drive, and cause it to shut down.

To solve this problem, AutomationDirect offers a regeneration clamp and a braking resistor as optional accessories. The regen clamp has a built-in 50W braking resistor. For additional braking power (larger overhauling loads), an optional 100W braking resistor is also available.

Regeneration Clamp Description

As with most stepper systems, a clamp circuit is often required to limit increased power supply bus voltage when the motor is decelerating under load. This is commonly referred to as "regeneration," which is what happens when DC motors are driven by their load. During regeneration, the DC motor can produce enough voltage to actually exceed the input power supply voltage.

With a Regen Clamp, one or more stepper drives can be protected from "Over Voltage" conditions by placing the clamp module between the power supply and the drive. The clamp tracks the input power supply, and will operate from 24 to 80 volts. No adjustments are needed.

The Regen Clamp is designed to handle a wide range of conditions. The voltage input matches the needs of the SureStep stepper drives by providing 24 to 80 VDC capabilities, and external power resistors can be added for even greater continuous power requirements. The clamp modules are small and compact to minimize impact on the system design. More than one stepper drive can be connected to the clamp module with the potential to handle an entire multi-axis system.



Regeneration Clamp



Braking Resistor

Regeneration Clamp Features

- Built-in 50W power resistor for more continuous current handling (optional 100W resistor is also available)
- Mounted on a heat sink
- Voltage range: 24–80 VDC; no user adjustments required
- Power: 50W continuous; 800W peak
- Wire connection: 6-pin screw terminal block; 12–18 AWG wire.
- Indicators (LED):
Green = power supply voltage is present
Red = clamp is operating (usually when stepper is decelerating)
- Protection: The external power supply is internally connected to an "Input Diode" in the regen clamp that protects the power supply from high regeneration voltages. This diode protects the system from connecting the power supply in reverse. If the clamp circuit fails, the diode will continue to protect the power supply from over-voltage.
- RoHS

SureStep Series Specifications – Microstepping Drives Optional Accessories		
Part Number	Price	Description
STP-DRVA-RC-050 *	<-->	Regen Clamp: use with DC-powered stepper & servo drives; 50W, 24–80 VDC
STP-DRVA-BR-100	<-->	Braking Resistor: use with STP-DRV-RC-050 regen clamp; 100W, 10 ohms

* Do not use the regeneration clamp in an atmosphere containing corrosive gases.

SureStep® Stepping System Drives

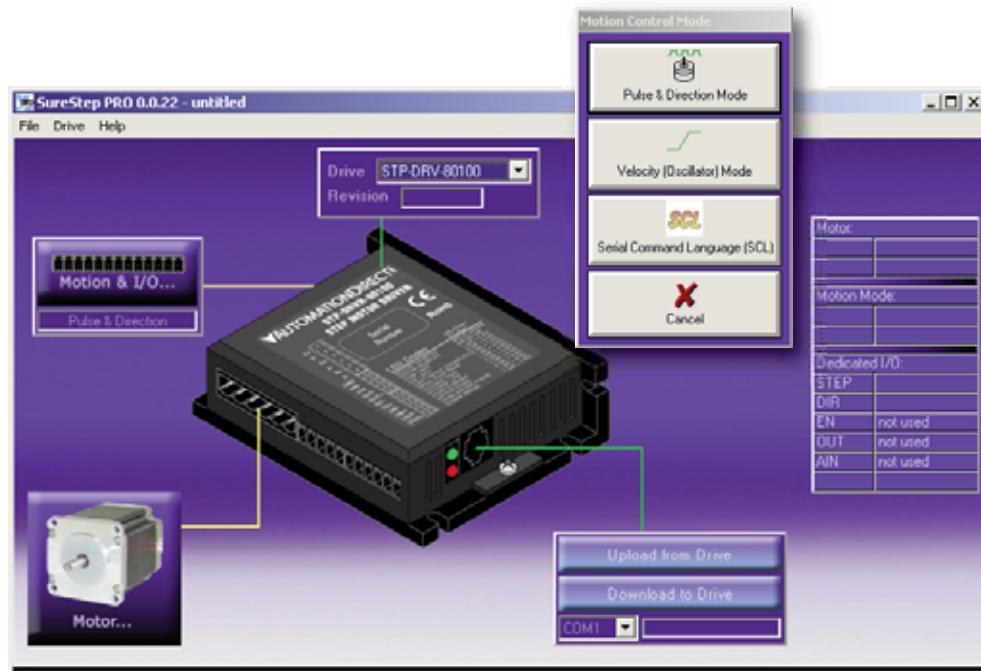
SureStep® Microstepping Drives Accessories

SureStep Pro Drive Configuration Software - for Advanced Stepper Drives

Free Download

SureStep Pro configuration software is available as a free download from our website for SureStep advanced drives (STP-DRV-4850 & -80100).

- Used for easy configuration and setup of the drive, including drive, motion control mode, I/O, motor.
- Serial command language for motor drive control via serial port; eliminates the need for separate motion controllers or indexers; provides easy interface to other industrial devices such as PCs, PLCs and HMI's.
- Easily use the ASCII output commands from most of our PLCs to enable indexing capability.
- Help files include technical data, application information, advanced setup, serial command instructions.
- Runs on 32-bit/64-bit Windows 7 and XP operating systems.



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SureStep Drive Configuration Software - for Advanced Stepper Drives

Part Number	Price	Description
STP-PRO *	<-->	Windows-based configuration software for use with SureStep STP-DRV-4850 and STP-DRV-80100 advanced stepper drives. Requires Windows XP or Windows 7 (32 or 64-bit) operating system, minimum 12MB hard drive space, and RS-232 port (software also compatible with USB-RS232 adapter).

* Available for purchase on CD or can be [downloaded for free](http://www.AutomationDirect.com) from AutomationDirect Web site (www.AutomationDirect.com).

Wiring Solutions using the ZIPLink Wiring System

ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the ZIPLink System ranging from

PLC I/O-to-ZIPLink Connector Modules that are ready for field termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of ZIPLink modules are provided with ZIPLink cables. See the following solutions to help determine the best ZIPLink system for your application.

Solution 1: DirectLOGIC, CLICK and Productivity3000 I/O Modules to ZIPLink Connector Modules

When looking for quick and easy I/O-to-field termination, a ZIPLink connector module used in conjunction with a prewired ZIPLink cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.

Using the PLC I/O Modules to ZIPLink Connector Modules selector tables located in this section,

1. Locate your I/O module/PLC.
2. Select a ZIPLink Module.
3. Select a corresponding ZIPLink Cable.



Solution 2: DirectLOGIC, CLICK and Productivity3000 I/O Modules to 3rd Party Devices

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the ZIPLink Pigtail Cables. ZIPLink Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.

Using the I/O Modules to 3rd Party Devices selector tables located in this section,

1. Locate your PLC I/O module.
2. Select a ZIPLink Pigtail Cable that is compatible with your 3rd party device.



Solution 3: GS Series and DuraPulse Drives Communication Cables

Need to communicate via Modbus RTU to a drive or a network of drives?

ZIPLink cables are available in a wide range of configurations for connecting to PLCs and SureServo, SureStep, Stellar Soft Starter and AC drives. Add a ZIPLink communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,

1. Locate your Drive and type of communications.
2. Select a ZIPLink cable and other associated hardware.



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Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with DirectLOGIC, CLICK, and Productivity3000 CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the **Serial Communications Cables** selector table located in this section,

1. Locate your connector type
2. Select a cable.



Solution 5: Specialty ZIPLink Modules

For additional application solutions, ZIPLink modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

Using the **ZIPLink Specialty Modules** selector table located in this section,

1. Locate the type of application.
2. Select a ZIPLink module.



Solution 6: ZIPLink Connector Modules to 3rd Party Devices

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible ZIPLink Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the **Universal Connector Modules and Pigtail Cables** table located in this section,

1. Select module type.
2. Select the number of pins.
3. Select cable.





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Motor Controller Communication

Drive / Motor Controller (GS/DuraPulse/SureServo/SureStep/Stellar) ZIPLink Selector											
Drive / Motor Controller		Communications		ZIPLink Cable							
Controller	Comm Port Type	Network/Protocol	Connects to	Comm Port Type	Cable (2 meter length)	Cable Connectors	Other Hardware Required				
GS1	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	—				
			D2-260 CPU		—		—				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	—				
			ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2		—				
			FA-ISOCON	5-pin Connector	GS-ISOCON-CBL-2	RJ12 to 5-pin plug	—				
GS2	RJ12	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	GS-RJ12-CBL-2	RJ12 to RJ12	—				
			DL05 PLCs				—				
			DL06 PLCs	Port 2 (HD15)			—				
			D2-250-1 CPU				FA-15HD				
			D2-260 CPU				—				
		RS-485 Modbus RTU	D4-450 CPU	Port 3 (25-pin)	GS-485HD15-CBL-2	RJ12 to HD15	FA-CABKIT				
			P3-550 CPU	Port 2 (RJ12)			—				
			DL06 PLCs	Port 2 (HD15)			—				
			D2-260 CPU				—				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	—				
DuraPulse (GS3)	RJ12	RS-485 Modbus RTU	ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2		—				
			FA-ISOCON	5-pin Connector	GS-ISOCON-CBL-2	RJ12 to 5-pin plug	—				
			DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2		—				
			D2-260 CPU				—				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	—				
Stellar (Soft Starter) SR44 Series	RJ45**	RS-485 Modbus RTU	ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2	RJ45 to HD15	SR44-RS485**				
			DL06 PLCs	Port 2 (HD15)	SR44-485HD15-CBL-2						
			D2-250-1 CPU								
			D2-260 CPU		RJ45 to RJ12						
SureServo	IEEE1394 (CN3)	RS-232 Modbus RTU	ZL-CDM-RJ12Xxx*	RJ12	SR44-485RJ45-CBL-2	RJ45 to HD15	SR44-RS485**				
			CLICK PLCs	Port 2 (RJ12)	SVC-232RJ12-CBL-2						
			DL05 PLCs								
			DL06 PLCs	Port 2 (HD15)		6-pin IEEE to RJ12					
			D2-250-1 CPU								
			D2-260 CPU								
		RS-485 Modbus RTU	D4-450 CPU	Port 3 (25-pin)	SVC-485HD15-CBL-2	6-pin IEEE to HD15	FA-CABKIT				
			P3-550 CPU	Port 2 (RJ12)			—				
			DL06 PLCs	Port 2 (HD15)			—				
			D2-260 CPU				—				
SureStep	RJ12	RS-232 ASCII	ZL-CDM-RJ12Xxx*	RJ12	SVC-485RJ12-CBL-2	6-pin IEEE to RJ12	—				
			USB-485M	RJ45	SVC-485CFG-CBL-2	6-pin IEEE to RJ45	—				
			DL06 PLCs	Port 2 (HD15)	STP-232HD15-CBL-2	HD15-pin to RJ12	—				
			D2-250-1 CPU				—				
			D2-260 CPU (Port2)				—				
* When using the ZL-CDM-RJ12Xxx ZIPLink Communication Distribution Module, replace the lowercase "xx" with the number of RJ12 ports, i.e. "4" for four ports, or "10" for ten ports. (ex: ZL-CDM-RJ12X4 or ZL-CDM-RJ12X10)											
	** The SR44-RS485 Communications Adapter must be installed for RS-485 communications with the Stellar soft starters.										